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TOWARD A SECOND GENERATION MEOCS: RECOMMENDATIONS FOR ADMINISTRATION FORMAT AND ISSUE COVERAGE

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Abstract

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Toward a Second Generation MEOCS: Recommendations for Administration Format and Issue Coverage

Since 1990 the Military Equal Opportunity Climate Survey (MEOCS) has been administered to service members and civilian employees of the Department of Defense (Landis, Dansby, & Faley, 1993). The MEOCS has become a primary instrument used by the Department of Defense to assess equal opportunity climate in military units. This report discusses the structure and issue coverage of the current MEOCS, examines contemporary literature on survey technology and administration, and explores possible directions for the further development of the MEOCS.

Structure of the MEOCS. The MEOCS is a 124-item paper-and-pencil inventory composed of six parts (Landis, Dansby, & Faley, 1993). In the first part respondents are asked to estimate the likelihood that 50 equal opportunity behaviors occurred in their unit over the past 30 days. Likelihood estimates are given on a five-point scale ranging from "very high chance that the action occurred" to "almost no chance that the action occurred." Principal components analysis of this section by Landis (1990) revealed five factors addressed by these questions: sexual harassment and discrimination, differential command behaviors, positive command behaviors, racist/sexist behaviors, and reverse discrimination.

Three short parts of the MEOCS deal with respondents' attitudes towards their unit as an organization. These sections address levels of organizational commitment, work group effectiveness, and job satisfaction, using five-point Likert scales. The fifth part of the MEOCS consists of 27 questions adapted from the Racial Awareness and Perceptions Scale (RAPS), an earlier instrument developed by the Army Research Institute to measure racial attitudes (Hiett, McBride, Fiman, Thomas, O'Mara, & Sevilla, 1978). Respondents answer using a five-point Likert scale from "totally agree" to "totally disagree." A final part of the instrument contains items concerning the respondents' personal experiences with discrimination as well as items addressing characteristics of the respondent and the unit.

The reliability and validity of the MEOCS have been discussed by Landis (1990) and Landis, Faley and Dansby (1992). Landis (1990) reported Cronbach's alphas ranging from .93 to .50 for the five factors of the MEOCS part 1, with "racist/sexist behaviors" and "reverse discrimination" the weaker of the five factors (alphas < .70). Landis, Faley, and Dansby (1993) examined reliability for all five parts of the MEOCS and found alphas above .75 for all factors except "belief in integration" (alpha = .60). No difference in reliability was found with respondents in lower enlisted ranks versus higher ranks. Dansby (1996) notes that the average alpha for the MEOCS factors is .85, better than that of most organizational climate surveys.

Validity of the MEOCS has been more difficult to assess. The MEOCS is intended to measure equal opportunity climate in military settings; however, as Dansby (1996) notes, there are few other quantitative measures of equal opportunity climate that could be used to examine the criterion validity of the MEOCS. In addition, an extensive debate continues in the management and organizational psychology literature over the nature of organizational climate itself (Denison, 1996). Despite these and other difficulties, some tentative evidence exists that the MEOCS is a valid measure of equal opportunity climate. Individuals were given a description of a unit with "good" or "poor" equal opportunity climate, and were asked to complete the MEOCS for the unit (Dansby, 1996). MEOCS scores for the "good" and "poor" units differed in the predicted direction. Dansby and Landis (1991) also report evidence for construct validity in initial field administrations of MEOCS. Results for demographic subgroups were all in the predicted directions.

Versions of the MEOCS. Since its inception, the MEOCS has evolved through several versions. Changes include addition and deletion of specific items, reordering of the sections, and development of a universal all-services version to replace separate versions for each service. Currently four versions are in use: The standard MEOCS (version 2.3), a version for all-male units (version 2.3M), an abbreviated version (MEOCS-LITE), and a version for use in units with civilian employees (MEOCS-EEO). The MEOCS-LITE eliminates questions measuring global attitudes towards discrimination and focuses on discrimination issues of concern to the local unit. The MEOCS-EEO contains additional factors which address civilian equal opportunity issues such as discrimination on the basis of age, religion, or disability.

Other specialized versions of the MEOCS have been developed to address specific respondent groups and situations. The Senior Leader Equal Opportunity Climate Survey (SLEOCS) assesses the equal opportunity beliefs, opinions, and perceptions of general and flag officers and senior civilian leaders (McIntyre, 1995). A Small Unit Equal Opportunity Climate Survey (SUEOCS) is being developed to assess equal opportunity attitudes of units with 50 or fewer service members (Albright & McIntyre, 1995). Finally, a civilian version for use in college and university settings also has been developed (University Equal Opportunity Climate Survey, or UEOCS).

Administration process of the MEOCS. The procedure for administering the current MEOCS is based on a six-step program that includes initial contact with a commander, clarification of expectations, collection of data, analysis, feedback of results to the commander, and follow-up (Landis, Dansby & Faley, 1993). Once a request is made to DEOMI for an evaluation, DEOMI staff determine which version is appropriate for the unit. A camera-ready copy is sent to the unit, with Scantron answer sheets and instructions. Data collection is conducted by a unit project officer who administers the survey and returns the answer sheets to DEOMI. Data are analyzed using a commercial statistics program and feedback is provided through an automated report generation program developed at DEOMI. After the report is sent to the unit, optional consultation and training are provided by DEOMI at the request of the commander.

Evaluation of MEOCS. Although a systematic evaluation of perceptions of MEOCS using a random sample of respondents and administrators has not been conducted, there have been content evaluations of written comments on the MEOCS. Grosch (1994) analyzed 658 open-ended written comments about MEOCS made by respondents from 1990 to July 1994. Comments were coded into perceptions of style (the "tone" of the questions), perceptions of content (the substance of the survey and the topics covered), and miscellaneous (mostly external factors that influenced the way in which the respondent completed the MEOCS). Grosch found that 25% of the comments reflected the opinion that the MEOCS is biased toward finding a particular outcome, 13.7% felt the survey was offensive, and 14.6% felt that the wording of the survey items was not appropriate. However, the sample for this study represents only .3% of all MEOCS respondents in that time period. Given the extremely low percentage of respondents who made comments, results of this analysis should be interpreted with caution.

Hochhaus (1995) conducted a content analysis of open-ended comments made by 324 respondents on the Senior Leader Equal Opportunity Survey. Hochhaus developed a categorization scheme for written comments made in response to six questions concerning respondents' beliefs about the most significant EO issues facing their units, perceptions of the strengths and weaknesses of their service's EO programs, and opinions about the most important elements of an effective EO program. Factor analysis of responses indicated that respondents were concerned about EO backlash issues such as reverse discrimination. In addition, comments were directed towards a diverse set of issues including support of EO training, belief in the importance of leadership in EO effectiveness, and sexual harassment. Although Hochhaus' study does not address perceptions of the MEOCS as an instrument, it does shed some light on senior leaders' concerns about EO issues that form the content of MEOCS.

In the six years since its introduction, the MEOCS has expanded into a family of EO surveys that assess equal opportunity climate in a wide variety of settings and across diverse respondent groups. The surveys have been well accepted by commanders and now are standard tools used to assess equal opportunity climate in military units. Psychometric studies of the MEOCS surveys show them to have a stable factor structure with a high level of reliability. However, despite the evident success of the MEOCS, problems remain. As Landis, Dansby, and Faley (1993) note, mean responses on the MEOCS tend to shift towards the positive end of the scale, possibly indicating a social desirability response bias. In addition, current events and changes in the national demographic distribution bring to attention new equal opportunity issues that need to be addressed. Finally, new information technologies make possible administration of the MEOCS in different, and possibly improved, formats.

MEOCS 2000

Because of the issues noted above, a long-range planning strategy for development of the MEOCS recently was proposed (McIntyre, 1996). This plan, known as the MEOCS-2000 project, proposes to evaluate the current MEOCS and make recommendations for implementation of equal opportunity climate assessment in the military after the year 2000. As described by McIntyre (1996) the proposal has four parts:

MEOCS-2000 Proposal

- A review and summary of the psychometric properties of the MEOCS to assess the technical strengths and weaknesses of the current instrument
- A survey of current administrators of the MEOCS and field commanders who have used the MEOCS, to assess the perceived quality of the current instrument and administration process
- A review of published literature on equal opportunity climate assessment, focusing on recent technological advances in survey management and on emerging equal opportunity issues
- Use of the World Wide Web to collect information on survey technology and contemporary EO issues, and to identify EO experts for interviews

The goal of the MEOCS-2000 Project is not to replace the current instrument, but rather to identify options for future development of the MEOCS. The current report focuses on parts three and four of the MEOCS-2000 Project. Questions addressed by this report are:

- What current survey management technologies exist that could help streamline and improve the process for administering the MEOCS?
- How might the structure of the MEOCS be modified to address an increasingly diverse set of EO issues and demands?

The remainder of this report will address each of these questions in turn, and will conclude with a set of recommendations.

Recent Advances in Survey Technology

In the several years since the MEOCS was first administered, the pace of development in survey technology has accelerated. Although paper-and-pencil surveys are still the mainstay of survey research, many more options for survey administration have become available to researchers. Use of rapidly evolving communications technology media now enable researchers to administer surveys by fax, in CD-ROM format on individual personal computers (Dunnington, 1993), simultaneously to multiple users on computer network servers (Rosenfeld, Doherty, Vicino, Kantor, & Greaves, 1989), by electronic mail (Perlman, 1985; Sproull, 1986), or on-line via the World Wide Web (Read, 1991). In addition, computer-assisted personal interviewing (CAPI) and computer-assisted telephone interviewing (CATI) have expanded the use of surveys in marketing and political polling, as well as other applications (Baker, 1992; de Leeuw, Hox, & Snijkers, 1995).

Although computers have been used in administration of psychological instruments for more than twenty years (Rosenfeld, et al., 1989), use of computers for large scale surveying in organizations is a more recent trend. Researchers have been attracted to the use of automated data collection and analysis because of purported cost savings, as well as greater efficiency in data collection, analysis, and report generation. Large-scale computerized testing is now routinely done by Educational Testing Service in administration of the GRE (Mead & Drasgow, 1993), as well as by many corporations, including IBM (Read, 1991), AT&T, John Deere, and 3M. Military users of automated surveying include the Air Force Reserve, Army Research Institute,

Naval Pacific Fleet, and the Coast Guard, as well as several Air Force, Army, and Marine bases (Raosoft, 1996; Training Technologies, 1996)

Survey management software. In part, the burgeoning popularity of automated survey management has been made possible by the availability of a number of relatively inexpensive survey management software systems. Dunnington (1993) reviewed four organizational survey systems available at that time: Survey Software Systems (Insync Corporation); the Organizational Universe Survey System (Organization Universe Systems); On-Line Opinion Survey (IBM); and Ci2 and Ci3 (Sawtooth Software). A recent search of survey and polling software companies on the World Wide Web uncovered a dozen survey management packages offered by various companies (see Appendix). Typically these systems offer computer-assisted survey design, automated data collection, and automated analysis and report generation, either through a self-contained analysis package or by export of the survey data to a commercially available statistics program.

Computer-administered versus paper-and-pencil surveys

Although there has been a rapid expansion in the use of automated survey management packages, research on the effects of computer administration of surveys has not kept pace with developments in technology. However, an expanding body of work is beginning to address the comparability of paper-and-pencil versus computer-administered surveys on a number of dimensions, including the equivalence of data generated by the two methods, differences in respondents' perceptions and behaviors, levels of social desirability response bias with the two methods, and time and cost differences.

Data comparability. Can data from a computer-administered test be interpreted in the same way as data from a paper-and-pencil test? Mead and Drasgow (1993) conducted a meta-analysis of 159 cross-mode correlations from 29 studies using power and speeded tests of cognitive abilities. Speeded tests assess an individual's ability to respond to a homogeneous set of easy items in a limited time, whereas power tests assess an individual's ability to respond to items of varying difficulty without regard to time. As Mead and Drasgow note, two kinds of problems may emerge in changing the medium of administration of a test: (1) scores may shift either positively or negatively when the medium of administration is changed, and (2) the psychological construct being measured may be influenced by the medium of administration. The second question requires relating the paper-and-pencil and computer-administered tests to some external criterion to compare their construct validity. Unfortunately this issue is not addressed by most research in this area.

In the studies of cognitive ability testing reviewed by Mead and Drasgow, medium of administration influenced the equivalence of scores on speeded tests, but not on power tests. Mead and Drasgow conclude that scores from computerized and paper-and-pencil power tests can be assumed to be comparable; however a change in the administration mode of speeded tests should be undertaken with caution.

Other studies have addressed differences in administration mode in noncognitive tests. Kantor (1991) and Rosenfeld, et al. (1991), for instance, found equivalent overall levels of job satisfaction with computer and paper-and-pencil administration of the Job Descriptive Index. However, Rosenfeld, et al. (1991) also found a significant administration mode by self-monitoring interaction. High self-monitoring respondents reported higher levels of job satisfaction with a paper-and-pencil survey, whereas low self monitors reported higher job satisfaction with a computer-administered survey. Synodinos, Papacostas, and Okimoto (1994) administered touch-screen and paper-and-pencil satisfaction surveys at Honolulu International Airport. No significant difference in ratings using the two methods was found among randomly selected respondents. However, self-selected respondents gave more negative touch screen satisfaction ratings than the randomly-selected respondents. Synodinos, et al. interpret this finding as reflecting motivational differences between the self-selected and randomly-selected respondents. These studies suggest that method of sample selection and individual differences in impression management may influence the comparability of data from computer-administered and paper-and-pencil tests.

Some studies have investigated the influence of mode of administration in personality tests. For example, Lankford, Bell & Elias (1994) administered a battery of personality measures including the Beck Depression Inventory and the Purpose in Life Test to undergraduates using paper-and-pencil and computer-administered format. Subjects who had been pretested as high in computer anxiety scored higher on the Beck Depression Inventory and lower on the Purpose in Life Test. Because of these differences between high and low computer anxiety subjects, Lankford et al. conclude that standardized norms for some paper-and-pencil personality tests may not be applicable to computerized personality tests. King and Miles (1995), in one of the few studies to explore the factor structure of paper-and-pencil versus computer tests, investigated the similarity of underlying factors, factor loadings, and mean scores on the Balanced Inventory of Desirable Responding, the Mach V Scale, the Equity Sensitivity Instrument, and Rosenberg's Self-Esteem Scale. No evidence for an effect of administration mode was found. Number of factors, factor loadings, and mean scores did not differ in paper-and-pencil and computer administration conditions.

Some design considerations in survey management software may help to increase the equivalence of paper-and-pencil and computer surveys. Flexible computer software that allows the respondent to scan the survey and review and change responses increases comparability with paper-and-pencil tests (Spray, Ackerman, Reckase, and Carlson, 1989; Whitener & Klein, 1995). However, as discussed below, allowing respondents to review and change responses may also increase the level of social desirability response bias.

In summary, most studies find no overall difference in the data obtained through paper-and-pencil surveys and computer administered surveys. However, there are a few caveats: speeded tests may be more sensitive to changes in administration mode, and equivalence of the data may be influenced by respondent characteristics (such as self-monitoring), by whether the respondents were self-selected or randomly chosen, and by the features of the computer software program. Few studies have addressed the construct equivalence of paper-and-pencil versus computer surveys.

Respondent perceptions and behavior. The experience of taking a survey by computer can be radically different from taking a paper-and-pencil survey. Some computer surveys closely resemble their paper-and-pencil counterparts, but in other computer surveys respondents may be forced to respond to one item before the next one is presented, may be presented with audio-visual displays including sound clips and video images, and may be asked to respond in ways that would not be possible with a paper-and-pencil survey (as in reaction time measurement). Just the experience of typing a response rather than writing it may influence the nature of the response. Most computer survey programs allow branching of questions, so that each subject may complete a different set of items. All of these differences raise questions about differences in respondents' perceptions and behavior in computer surveys versus paper-and-pencil surveys.

Studies of respondent's affective reactions to computer surveys have focused on respondents' levels of involvement and enjoyment while completing computer surveys. For instance, Rosenfeld, et al. (1991) noted that subjects completing the Job Descriptive Index on computer reported enjoying the experience more than those who completed the paper-and-pencil version. Locke and Gilbert (1995) report similar results. When undergraduate students completed a short form MMPI and a Drinking Habits Questionnaire on computer, in paper-and-pencil format, or by interview, the computer format was perceived most positively. Subjects reported greater comfort, relaxation, enjoyment, anonymity, and confidence in the computer condition, and less fear, boredom, and embarrassment.

Other studies report no difference in respondents' perceptions of computer and paper-and-pencil surveys. Kantor (1991) administered the Job Descriptive Index to 176 Navy civilian employees either on personal computer or in paper-and-pencil format. As reported above, levels of job satisfaction did not differ between the two groups. In addition, there was no difference in respondents' enjoyment of the two formats or their self-reports of the truthfulness of their answers. Finegan and Allen (1994), in a series of three studies using a battery of attitude and personality measures found no difference in undergraduates' levels of enjoyment or anxiety in responses to computer and paper-and-pencil surveys.

Respondents' levels of computer literacy and computer anxiety play a part in affective reactions to computer surveys. Lankford, Bell, and Elias (1994) pretested subjects for state-trait anxiety, mathematics anxiety, and computer anxiety. Even with state, trait, and math anxiety partialed out, subjects who pretested high on computer anxiety scored higher on the Beck Depression Inventory and lower on the Purpose in Life Test when the tests were administered on computer than when they were given in paper-and-pencil format.

The impact of social factors on respondents' experiences of computer and paper surveys should not be minimized. For efficiency, paper-and-pencil surveys often are administered in large group settings. In contrast, many respondents to computer surveys complete surveys alone, or in the company of a small number of other respondents. As a result, most studies comparing paper-and-pencil surveys with computer-administered surveys confound administration mode with social environment (Whitener & Klein, 1994). An extensive body of research on social influence suggests that social environment may have a very considerable effect on respondents' perceptions and behavior while completing surveys (Cialdini, 1993; Kiesler, Siegel, & McGuire, 1984).

Unfortunately, very little research has addressed this concern. In a recent study, Whitener and Klein (1995) administered a battery of personality inventories to 120 undergraduate students in a 3 (mode of administration) x 2 (social environment) between-subjects design. Subjects completed surveys in paper-and-pencil format, on computer with no scanning allowed, or on computer with scanning allowed. In addition, half the subjects completed the surveys in a group setting and half alone in an office. No differences in need for achievement, self-esteem, of locus of control were found across the three modes of administration; however, subjects reported higher levels of self-esteem in the group administration condition than in the individual administration condition. An interaction between mode of administration and social environment was found for the measure of locus of control. Although somewhat flawed in design, this study is a first step towards examining the effects of social environment in survey administration.

In summary, there is evidence that respondents perceive computer-administered surveys to be at least as enjoyable and involving as paper-and-pencil surveys. Given the relative novelty of computer surveys and the ability of computers to produce colorful and dynamic stimuli, this finding is not surprising. However, respondents' levels of computer anxiety and the social environment in which the survey is given may also influence subjects' survey-taking experience. Over time, as the computer literacy and experience of respondents increase, these results may be expected to change.

Social desirability bias. Are survey responses given by computer more or less honest than responses to paper-and-pencil surveys? The problem of social desirability response bias haunts survey research of all types, but particularly is an issue in surveys such as the MEOCS, which address sensitive and potentially embarrassing issues. Respondents may be less than candid on surveys in a number of ways, including giving misleading or erroneous responses, refusing to respond to questions, or underestimating or overestimating responses to put themselves in a good light (Kiesler & Sproull, 1986). Such biased responding may arise from a conscious attempt to hide potentially embarrassing information, or may result from respondents' lack of insight or subconscious motives to protect self-esteem. Paulhus (1984, cited in Lautenshlager & Flaherty, 1990) has labeled these two forms of response bias "impression management" and "self-deception." Paulhus suggests that impression management is more likely to be influenced by factors in the testing situation than is self-deception.

Although a great deal of research has been directed at the issue of social desirability response bias in computer-administered versus paper-and-pencil surveys, results are inconclusive. Computer-administered surveys initially were seen as one way of reducing social desirability response bias. Early reports suggested that computer surveys increased candor in reporting of sensitive issues such as alcohol consumption, sexual behavior, and genito-urinary symptoms (Locke & Gilbert, 1995; Rosenfeld, et al, 1991). Three explanations have been proffered for this effect: (a) On paper-and-pencil surveys respondents can review and change answers, and thus have the opportunity to alter their responses in a socially desirable direction; (b) When responses are given on computer, a more impersonal and anonymous social situation is created in which the person is less concerned about appearances; and (c) Respondents on computer surveys may believe that their answers are being monitored, as in the bogus pipeline effect in attitude research (Rosenfeld, et al., 1991).

Some studies have found that respondents give more extreme responses on computer-administered surveys than on paper-and-pencil surveys. For instance, Feinstein (1986, cited in Kantor, 1991) found that respondents completing a computer survey on job conditions used harsher language in criticizing their supervisors than those who completed the survey in paper-and-pencil format. Keisler and Sproull (1986) reported that respondents who completed a computer version of the Need for Approval scale gave fewer socially desirable responses than those who completed the paper-and-pencil version. These findings support the view that people are more self-absorbed and disinhibited when using a computer than when completing paper-and-pencil surveys, perhaps leading to more candid responses. The social anonymity and depersonalized nature of computer communication may encourage stronger language and more assertive responses (Kiesler, Siegel, & McGuire, 1984).

A more recent study by King and Miles (1995) examined differences in factor structure and impression management in computer-administered and paper-and-pencil surveys. Although no differences were found in number of factors or in factor loadings (as noted above), impression management was higher in the paper-and-pencil surveys than in the computer surveys. This suggests that differences in impression management between the two modes of administration cannot be attributed to measurement inequivalence of the instruments.

In contrast to the research just described, a smaller set of studies have found increased social desirability bias on computer surveys. One of the most cited of these is a study by Lautenschlager and Flaherty (1990) in which 241 undergraduate psychology students completed Paulhus' Balanced Inventory of Desirable Responding (BIDR) in computer or paper-and-pencil versions. Subjects in an "identified" condition were asked to provide their name and other identifying information, and were told that their survey responses might enable them to participate in future research. Subjects in the "anonymous" condition were not asked for identifying information and were told that their responses would be anonymous. In contrast to previous studies, greater impression management was found in the computer surveys than with the paper-and-pencil surveys. As expected, impression management in the anonymous condition was lower than in the identified condition. In a more recent study by Finegan & Allen (1994) using three measures of socially desirable responding, no main effect for administration mode on socially desirable responding was found. However, there was an interaction of administration mode with computer experience. Respondents with little computer experience who completed the surveys on computer showed higher levels of socially desirable responding.

A third set of studies found no difference in social desirability response bias between computer and paper-and-pencil surveys. Millstein (1987) asked female adolescents about their sexual behavior, substance use, and gynecologic and nongynecologic symptoms in a computer interview, face-to-face-interview, or self-administered questionnaire. No differences in responses were found across the three administration modes. Booth-Kewley, Edwards, and Rosenfeld (1992) administered two scales from the BIDR to Navy recruits under three administration conditions: computer-administration with backtracking allowed, computer administration with no

backtracking, and paper-and-pencil. Half the respondents were asked to provide their names and social security numbers and half completed the survey anonymously. No main effect for administration mode was found; however, in support of Lautenschlager and Flaherty (1990), impression management was lower in the anonymous condition than in the identified condition. Finally, Locke and Gilbert (1995) found no difference in self-disclosure among undergraduates who completed a short form MMPI and Drinking Habits Questionnaire on computer or by paper-and-pencil questionnaire. However, respondents in both conditions showed higher self-disclosure than students who were interviewed.

Individual differences in impression management might be expected to influence socially desirable responding. A popular instrument used to measure impression management as a personality trait is the self-monitoring scale (Snyder, 1974). High self-monitors are concerned about social norms and are skilled at changing their behavior to fit in with situational expectations. Low self-monitors are less concerned about social norms and act more according to internal values and beliefs. Rosenfeld, et al. (1991) hypothesized that individuals high in self-monitoring would give overly positive responses on a paper-and-pencil survey of job satisfaction, but not on the computer version. Low self-monitors were expected to be unaffected by mode of administration. Results supported the hypothesis for high self-monitors, but not for low self-monitors. Low self-monitoring respondents showed higher job satisfaction scores on the computer survey than on the paper-and-pencil survey.

Although the research on social desirability response bias in computer-administered and paper-and-pencil surveys is mixed, it is clear that respondents' ability to scan and to modify answers, individuals' computer experience and impression management tendency, and the relative anonymity of the survey environment all contribute to the pressure towards socially desirable responding.

A number of strategies have been used by researchers to limit the influence of social desirability response bias in surveys. Techniques include use of anonymous, self-administered questionnaires; inclusion of forced-choice questions that are equivalent in social desirability; use of the randomized response technique (described below); physiological measurement of attitudes through methods such as pupil dilation and galvanic skin response; and use of the "bogus pipeline" technique, in which subjects give responses while connected to a machine which supposedly can detect lies (Rosenfeld, et al., 1991). Other techniques involve hiding the sensitive question among innocuous questions, reducing the threatening nature of the sensitive question by including a statement that the behavior in question is "normal," and asking the respondent how others might feel about the issue (Hosseini & Armacost, 1993).

Two of the most recent and sophisticated strategies for reducing social desirability response bias are the randomized response technique (RRT) and use of neural network statistical techniques. Hosseini and Armacost (1993) describe in some detail the application of the randomized response technique to organizational surveys. In one of the more popular versions of this technique, respondents are presented with questions in pairwise fashion. One of the two

questions is innocuous ("Is your birthday in February?") while the other addresses the sensitive issue in question. Respondents are asked to answer only one of the questions, depending on the results of a randomization process. For instance, a respondent may be asked to draw a marble from a jar for each pair of questions. If a white marble is drawn, the subject answers the innocuous question, and if a red marble is drawn the subject answers the sensitive question. Randomization might also be done by flipping a coin or using a spinner. Once the data are collected, statistical techniques are applied to estimate the proportion of respondents who answered in a particular way to the sensitive question (Hosseini & Armacost, 1993). Several versions of this technique have been developed using different formats for presentation of questions.

Although cumbersome, RRT has the advantage of insuring that individual answers cannot be attributed to a particular respondent, thus increasing the respondent's confidence in his or her privacy and anonymity. In addition, researchers are protected from legal action because an individual respondent's answer to a specific question cannot be known. Research using RRT has addressed such issues as abortion, sexual behavior, and drug use. In organizational settings RRT has been used in surveys of employees' compliance with financial procedures, and in studies of shoplifting and illegal use of company resources (Hosseini & Armacost, 1993). The advantages of RRT are not without cost, however. RRT studies require more extensive instructions to the respondent about the procedure. In addition, larger samples are required, and the aggregate nature of the data limits the kinds of statistical techniques that can be used.

A recently developed statistical technique just beginning to be applied to surveys is the use of neural networks. Neural networks emerged from research on models of how the human nervous system learns, but have evolved into a general process for deriving patterns and meaning from complex and imprecise data (Z Solutions, 1996). The resulting statistical techniques are similar to other strategies used to extract relationships from large data sets, such as multiple regression, factor analysis, and cluster analysis (Gatley, 1996). Neural network techniques, however, are said to be more sensitive to interactions and interdependencies in the data. Because the procedure is iterative, evolving through a series of layers of processing, the program can "learn" from one layer to another as it converges from the raw data to a solution. For instance, the technique might be used to predict how many runs will be scored in a baseball game, using the team's offensive statistics over a series of games (Z Solutions, 1996). Typical applications for neural networks have been in engineering, in pattern recognition and robotics. However, recently business applications have emerged, such as market forecasting and detection of credit card fraud through recognition of patterns of card use associated with stolen cards (Gatley, 1996). A Web search on neural networks revealed several companies specializing in application of neural networks to survey research. At least one such company, Delphi Consultative Surveys and Research (International) Ltd., has applied these techniques to the study of racial relations in the United States. It is claimed that this technique can be used to derive descriptions of an organization's equal opportunity climate, while asking indirect questions that would not arouse social desirability response bias (A. S. Gillman, personal communication, August 16, 1996).

Time and cost differences. Although computer-administered surveys offer a number of advantages, practical considerations of time and cost savings need to be considered. Time factors include the time the subject uses to complete the survey, data entry and analysis, and report preparation, as well as mailing delays. Most studies comparing computer-administered surveys to paper-and-pencil surveys find that respondents complete surveys faster on computer (Rosenfeld, Booth-Kewley, & Edwards, 1993). Since computer-administered surveys also typically involve automated data entry and analysis, these phases of the survey process also are faster. However, computer-administered surveys use more complex and vulnerable technology than paper-and-pencil surveys. The downtime associated with computer malfunctions and maintenance has not been investigated in these studies.

Paper-and-pencil surveys are usually least expensive in terms of materials cost and mailing expenses. The cost of computer-administered surveys is difficult to determine, and varies depending on the hardware and software available to the researchers. If appropriate computer equipment is in place, computer surveys may not be more expensive than paper-and-pencil, and may be less expensive due to greater efficiency in data entry and analysis (Rosenfeld, et al., 1993). Often cost comparisons do not take into account the expense of labor, which may be considerable in the preparation, mailing, and data entry for a paper-and-pencil survey. Although processing of computer surveys likely requires more skilled labor, costs may be expected to be less since the number of hours required to process the survey will be considerably reduced. Given the number of variables involved, a true comparison of the cost and time involved in a computer-administered versus paper-and-pencil survey must be done on a case by case basis.

Applicability of computer-administered formats to MEOCS

In many ways the MEOCS surveys are not typical of surveys administered in organizational settings. They are part of an ongoing research program in one of the largest organizations in the world--the U.S. Department of Defense. They are given only at the request of a unit commander and feedback is confidential to that commander. The testing situations vary widely, from field units to command offices, and the respondents vary from new recruits to career senior officers and civilian employees. Due to the large scale of the MEOCS program, any decision to change the format of MEOCS to a computer-administered survey would carry with it potentially great benefits, but also potentially great costs.

Because the current MEOCS uses scanned answer sheets, data entry is already more efficient than unscanned paper surveys. In addition, the procedure for analysis and report preparation of the MEOCS has been automated. Despite these advantages, inefficiencies exist in the administration process. The master form of the MEOCS is mailed to a unit, photocopied on site, and answer sheets are returned by mail. This delivery process can result in delays of a week or more in each direction. In addition, the answer sheets must be hand fed through a scanner, a process that is both labor intensive and time consuming. Converting to a computer-administered format might result in some time savings in these areas. If a disk-based MEOCS were developed

to be administered by personal computer on site, data could be in a format ready for analysis when the disk was returned, thus eliminating the time associated with scanning. Data from the disk could be returned either by conventional delivery or electronically. Electronic transfer of data would also reduce delays associated with mail delivery.

Computer-administered surveys are capable of presenting a much greater variety of questions and question formats than paper-and-pencil surveys. In addition to standard text and image formats, sounds, narrations, and video can be presented on computer administered surveys. Branching of questions is much less awkward with computer-administered surveys than with paper-and-pencil surveys. These features would give greater flexibility to the design of future versions of the MEOCS.

Finally, using a computer-administered format, it may be possible to automate the randomization process for the randomized response technique. This would enable development of an RRT version of the MEOCS that would be less susceptible to social desirability response bias. In sum, a computer-administered MEOCS could result in faster processing of the surveys, more variety in question design, and potential reduction in response bias.

Several notable issues and problems exist in converting to a computer-administered MEOCS, however. First among these is the availability of computers in the units where the MEOCS is administered. The current MEOCS often is given in group settings, so that data may be collected from a large number of respondents at once. The speed of data collection with a computer-administered MEOCS would be dependent on the relationship between the number of computers in the unit to the number of personnel. In units with a high ratio of computers to personnel (such as command offices) data collection might be relatively efficient; but in units with few computers and a large number of personnel (such as field units) there would be a substantial loss in the efficiency of data collection. For this reason, any computer-administered MEOCS would not be suitable for all units in which the MEOCS is currently administered and therefore could not be considered a replacement for the paper-and-pencil version. As computers become more ubiquitous in military units, this may become less of an issue.

A second question concerns the potential computer anxiety of MEOCS respondents. Research by Lankford, Bell, and Elias (1994) noted above suggests that when respondents are high in computer anxiety, data from a computer-administered survey will not be comparable to the paper-and-pencil version. It is likely that MEOCS respondents vary widely in their experience with computers and their level of comfort with computers. Therefore a computer-administered MEOCS would be most applicable in units in which the personnel are high in computer literacy and there are a sufficient number of computers to allow efficient administration.

Security issues also would be of concern with a computer-administered MEOCS. Although it is possible for respondents to submit multiple or fraudulent copies of MEOCS in the paper-and-pencil version, this possibility is reduced by administration of MEOCS in supervised groups. If MEOCS were administered individually on computer, it might be easier for

respondents to submit multiple copies. In addition, a breach in security could occur when data is sent electronically. Use of a password system for respondents and encryption of data that is transmitted electronically may lessen some of these concerns. Some of the current commercially available survey management systems include security features to block multiple submissions (see Appendix).

It is clear from the preceding discussion that a computer-administered MEOCS will not replace the paper-and-pencil version in the short term. However, given the potential advantages of a computer-administered format, development of a prototype computer version of MEOCS to be used with a limited set of units may be desirable.

Equal Opportunity Issue Coverage in the MEOCS

The MEOCS originally was developed to measure equal opportunity climate for minorities and women in the military. In 1971, the Department of Defense established the Defense Race Relations Institute to develop a training program in race relations. Later, in 1979, the name of the Institute was changed to the current Defense Equal Opportunity Management Institute to reflect an expanded mission, including training on equal opportunity issues for women as well as racial minorities (Dansby & Landis, 1991). This change in focus also included a shift in emphasis from concern with individual racism and sexism to institutional discrimination on the basis of race and gender. However, the overall mandate of the Institute remained the same: To improve the readiness and effectiveness of military units by minimizing the destructive influences of prejudice and discrimination. With this objective, the MEOCS was developed as an instrument for diagnosing the racial and sexual equal opportunity climates of units, so that appropriate training could be implemented.

Rather than measuring attitudes, as had earlier surveys such as the Racial Attitudes and Perceptions Survey (Hiett, et al., 1978), the MEOCS focuses on respondents' perceptions of discriminatory behaviors. This approach is grounded in a model of the equal opportunity climate of an organization as a combination of individuals' perceptions and expectancies (Dansby and Landis, 1991). In Part I of the MEOCS, respondents are asked to estimate the likelihood that a series of discriminatory behaviors occurred in their unit within the past 30 days. As described above, other parts of the MEOCS address respondents' attitudes as well as perceptions of organizational commitment, job satisfaction, and work group effectiveness. The current MEOCS, then, measures three facets of equal opportunity climate: Perceptions of discriminatory behaviors, perceptions of the organization, and racial and gender related attitudes. Factor analyses of the standard MEOCS show it to have twelve factors (DEOMI, n.d.). Factors 1 to 5 assess respondents' perceptions of equal opportunity behaviors in the unit, factors 6 to 8 measure respondents' perceptions of the unit as an organization, factors 9 to 11 assess respondents' attitudes towards general racial and gender issues, and factor 12 is a global evaluation of the unit's equal opportunity climate.

Factors in the Standard MEOCS (version 2.3)

Perceptions of Equal Opportunity Behavior

1. Sexual Harassment and Discrimination
2. Differential Command Behavior toward Minorities
3. Positive Equal Opportunity Behaviors
4. Racist/Sexist Behaviors
5. "Reverse" Discrimination I (at the local unit level)

Perceptions of the Unit as an Organization

6. Commitment (to the organization)
7. Perceived Work Group Effectiveness
8. Job Satisfaction

Attitudes Toward Racial and Gender Issues

9. Discrimination toward Minorities and Women
10. "Reverse" Discrimination II (at the global level)
11. Attitudes Toward Racial/Gender Separatism

Global Evaluation of the Unit's Equal Opportunity Climate

12. Overall EO Climate

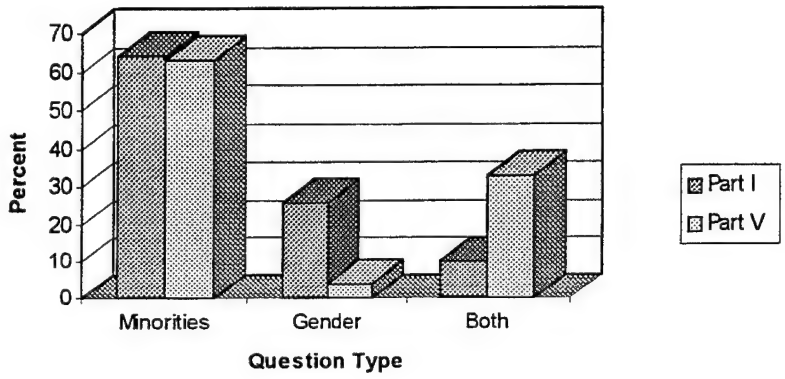
One characteristic to note in this factor structure is the intermingling of racial and gender discrimination issues. In particular, factors 4, 9, and 11 concern both racial and sexual discrimination issues. The content of some individual questions in the MEOCS also reflects a combined concern with racial and gender issues. For instance, "Graffiti written on the organization's restroom or latrine walls 'puts down' minorities or women" (question 13). Figure 1 shows the distribution of questions on Part I and Part V of the MEOCS based on racial and gender content. Although questions specifically addressing racial issues predominate, a substantial percentage of questions in both parts mix racial and gender issues. This "double barreled" approach, though supported by factor analysis (Dansby & Landis, 1991), complicates interpretation of data from these questions and factors (Zeisel, 1981).[1]

The MEOCS can be characterized as primarily addressing racial issues in equal opportunity climate, with gender issues a secondary concern. The intermixing of these issues in the MEOCS poses several problems. First, it clouds interpretation of scores from factors in which

[1] Editor's Note: This has been recognized by DEOMI researchers. However, the concept of EO climate, which is the primary concern of MEOCS, is expansive. There is considerable evidence from preliminary development of MEOCS that respondents do not make such clear distinctions between EO climate for gender and EO climate for race. In early development, responses to over 100 items representing separate (and combined) probes for gender and race issues were factor analyzed. Empirical results indicated the issues were often highly intercorrelated as measures of EO climate. In other words, respondents tended to perceive a poor racial climate and a poor gender climate as occurring together. Though it would have been possible to separate scales (e.g., Racist/Sexist Behaviors) into subscales reflecting race and gender items, it was thought to be misleading to so. Internal studies have shown high correlation between the racial and gender subscales when assessing EO climate.

racial and gender issues are mixed. If a unit scores unfavorably on one of these factors, does it indicate a problem in racial relations, gender relations, or both? Second, it limits the flexibility of the MEOCS in addressing specific equal opportunity concerns that commanders may have. For instance, a particular unit may have all male, but racially diverse personnel. As currently constructed, the MEOCS could not specifically address the commander's concern with racial issues without also asking about gender issues.

Figure 1. Distribution of questions by issue in MEOCS 2.3, Parts I and V



Despite these problems, the MEOCS remains one of the most successful surveys of its kind. Why should effort be directed towards a major redesign of the MEOCS? One reason concerns the changing demographic population from which the military draws its personnel. As has been noted in the public media, the demographics of the U.S. population will change radically in the next fifty years, so that sometime in the next century Whites will no longer be in the majority. The increase in Hispanic and Asian, as well as African-American and Native American segments of the population will force a reconsideration of the terms "majority" and "minority." Rather than being divided primarily along black/white lines, we are becoming a multi-ethnic society. In order to remain a valid measure of equal opportunity climate, the MEOCS will need to change to reflect these trends.

In addition, other equal opportunity issues emerge from time to time that may need to be addressed. A recent example is concern over possible extremist group activity in the military. In December 1995 a civilian couple in Fayetteville, North Carolina, was murdered by three soldiers based at Fort Bragg who were associated with a local "skinhead" group. Following this racially motivated incident, the Secretary of the Army chartered a task force to investigate the extent of hate group activity in the Army (Department of the Army, 1996). The task force initiated interviews with close to 6,000 soldiers at 28 bases, and administered confidential surveys to 17,000 other soldiers.

On the basis of this information the task force concluded that active participation in hate group activity by Army personnel was minimal. In interviews, fewer than one percent of officers, noncoms, and civilian employees reported that a soldier or civilian employee was an active participant in an extremist group, and also less than one percent reported having any contact with extremist groups. In contrast to the interviews, in the surveys 3.5% reported having been approached to join extremist organizations and 7.1% reported knowing another soldier whom they believed to be a member of an extremist group. The latter figure was discounted by the task force due to the potential for multiple reporting of single incidents on the surveys. However, data from the interviews may underrepresent extremist activity since the interviews were carried out in groups, thus maximizing pressures for response bias.

Although active participation in extremist groups by Army personnel apparently is minimal, the task force noted that extremist groups are active in communities surrounding some Army bases, and that military personnel often are exposed to literature from extremist groups. As a result, the task force made several recommendations on modifications to regulations concerning participation of personnel in extremist groups, education and training about extremist activities, and screening for extremist activity. The task force recommended that "automated climate surveys that include questions on extremism" be developed (Department of the Army, 1996, p. 29).

Changing the structure of MEOCS

As currently structured, the MEOCS is not as flexible as it might be. The intermingling of race and gender content prevents clear interpretation of the survey results, and limits the usefulness of MEOCS for units with specific equal opportunity concerns. In addition, the current structure does not lend itself readily to expansion in response to new equal opportunity concerns such as extremist activity. For these reasons, development of a modular MEOCS, with separate sections for racial issues, gender issues, and other concerns, seems desirable.

Any change to a large scale survey program entails certain costs. As McIntyre (1996) notes, changing MEOCS would involve development of a new report generation system, or at least modification of the current automated system. This concern might be lessened if a commercially available survey management program could be adapted for MEOCS. The financial and time costs in moving to a new system are unknown, and would need to be explored. Changing MEOCS also would involve retraining administrators and educating commanders in the field about the new system. Any new system would necessarily involve a break in the continuity of the MEOCS database. Studies would need to be done to determine the comparability of data from the old and new versions.

Instead of replacing the current MEOCS, a more modest goal would be to develop a modular, perhaps computer-administered, MEOCS as a supplement to the current survey. Inclusion of a core of questions from the old MEOCS would help to preserve the continuity of the database. Such a survey might be made available to units that meet the criteria discussed above.

Conclusions and Recommendations

What should the next generation of MEOCS look like? This report has explored the feasibility of two kinds of change to the MEOCS: (a) Change in the administration of MEOCS to a computer-administered mode, and (b) change in the structure of MEOCS to a modular format. In addition, new techniques for reducing social desirability response bias have been discussed. These options could be pursued independently or together in a prototype second-generation MEOCS.

Many possible scenarios exist for the development of MEOCS into the next century. As a first step toward exploring these options, a systematic survey of MEOCS users and administrators should be conducted, similar to that specified in the MEOCS-2000 proposal. This survey could be used both to obtain feedback on the current system and also to explore the feasibility of modular and computer-administered forms of the MEOCS. Respondents should be asked about the quality, informativeness, and ease of use of the current system, and about the relevance of specific EO issues to their work setting (McIntyre, 1996).

It is strongly recommended that a modular version of the MEOCS be developed. Such a version would remedy some of the difficulties in interpretation and administration discussed above, and would increase the flexibility of the MEOCS in adapting to future EO issues that may arise. If possible, a core of questions from the old MEOCS should be retained in the new version to facilitate continuity of the database.

A paper-and-pencil version of the MEOCS should be retained for the foreseeable future. Because of the diversity of settings in which the MEOCS is administered and the varying computer experiences of MEOCS respondents, no computer-administered version of the MEOCS can completely replace the current version. However, development of a computer-administered version of the MEOCS should be explored, both as a prototype for future MEOCS, and as an option for units that are able to utilize it.

Next Steps: Recommendations for Development of MEOCS

- Conduct a systematic survey of MEOCS users and administrators
- Develop a modular MEOCS
  - -- preserve continuity of the database through retention of a core of questions.
  - -- create separate modules dealing with racial issues, gender issues, and extremist activity
- Continue support and use of a paper-and-pencil MEOCS
- Develop a prototype computer-administered MEOCS
- Explore use of the randomized response technique or neural networks to reduce social desirability response bias

Finally, new techniques to reduce social desirability response bias merit exploration. In a survey such as the MEOCS, which asks about sensitive and possibly embarrassing issues, the potential for bias from respondents' evasion and misrepresentation cannot be underestimated. As has been noted, responses to the MEOCS tend to be shifted to the positive end of the scale. Whether this indicates the presence of favorable equal opportunity climates or is a symptom of response bias is an open question. If a valid assessment of equal opportunity climate is to be obtained, this issue must be addressed.

The evolution of survey management technology and changes in population demographics will inevitably lead to changes in the way equal opportunity climate is measured in organizations. The MEOCS is in a good position to lead the innovation.

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Appendix

Survey Management Software

CENSUS, MASQ, and P-MASQ

(Rosenfeld, et al., 1989) Three versions of an automated survey system developed at the Naval Personnel Research and Development Center (NPRDC). CENSUS is a XENIX-based system that allows simultaneous entry of responses from 16 users, either on-site or remotely through modem. Surveys can be customized to individual respondents through branching of questions. MASQ is an MS-DOS version of CENSUS that can be used on individual stand-alone microcomputers. P-MASQ is used on portable, laptop computers. Results are stored in ASCII files for export to data analysis programs.

Decisive Survey for Windows

By Decisive Technology Corporation (http://www.decisive.com/) For e-mail surveys. Response format can be "choose one," "choose all that apply," ratings or text responses. Allows for branching of questions. Results can be reported by question, by respondent, or by cross-tabs, and can be exported to SPSS OR SAS for further analysis.
System requirements: IBM compatible 486/33; 8 MB RAM; Windows 3.1 or later; 15 MB hard disk space plus 1 MB per 100 respondents; VGA 640x480 or higher color display.

Market View

By Research Systems (http://www.resys.se/). Available in a Full or Lite version, as well as an Academic version. Three steps: Questionnaire design, interviewing, and analysis. Modules available for installation on a local network or for distribution as a diskette survey.
System requirements: Full version -- 486 IBM compatible; Windows 3.x, Windows 95, or Windows NT; 8MB RAM; 7MB disk space. Lite version -- 386; ; Windows 3.x, Windows 95, or Windows NT; 4 MB RAM; 3MB disk space.

PinPoint

By Longman/Logotron, UK (http://www.logo.com/pinpoint/). Pinpoint is a package of four programs: a questionnaire designer, a data collector, a database, and a graph and chart generator. Designed primarily for e-mail surveys, but data may also be entered from scanned forms with compatible OMR software. Analysis module does descriptive statistics and chi-square; can export data to statistics programs.
System requirements: 386 IBM compatible; Windows 3.1 or higher (Windows 95 compatible); 4MB RAM; 4MB disk space.
Import/export to: CSV, TSV, Paradox, dBase, SPSS.

Sensus Q&A and Ci3 for Computer Interviewing

By Sawtooth Technologies (http://www.sawtooth.com/products.html)
Two systems for design and administration of computer-assisted interviewing questionnaires. Can create disk-by-mail, touchscreen, audio computer-aided self-administered interviewing, as well as central location interview questionnaires. Has multimedia capabilities to include sounds, narration, and video in surveys. Allows for branching, randomization, and response timing.

The Survey Manager for Windows

By Insync Corporation (http://vellocet.insync.net/). A survey management system that includes survey design, administration, analysis, and report formatting. Data may be entered directly, entered online, or may be optically scanned. Reports can be organized by question, by group, or by group/question. Performs descriptive statistics and has extensive graphing capabilities.
System requirements: IBM compatible, 8MB RAM, Windows 3.1 or later.
Cost: Single PC license: $495; Single site license: $1,980; Corporate license: $9,900.

Survey Said

Distributed by Marketing Masters
(http://surveysaid.ostech.com:8080/marketing_masters/mmasters.htm). Two versions: Survey Said for the Web, and Survey Said for Windows. Survey administration software for Internet surveys, electronic surveys, diskette surveys, kiosk surveys, and paper surveys.
System requirements:
Cost: $975.00 for the Web version

Survey Select

By Saja Software (http://www.surveyselect.com). Intended for business, marketing, and human resources applications. Three modules: Design, administration, and analysis. Surveys can be built from templates or customized. Generates hard copy questionnaires or can be administered at a single PC or over a PC network. An Internet version is expected by the end of 1996.
System requirements: 486/DX IBM compatible or higher; Windows 3.1 or higher; 6MB RAM; 5MB disk space; SVGA with 512K or better.
Maximum number of records: 3000 per survey
Cost: $595.

SurveyTracker

By Training Technologies, Inc. (http://www.traintech.com/). Training Technologies provides Total Quality Management consulting, training, and software services to business, academic, and governmental clients. The SurveyTracker software package includes tools for planning, budgeting, design, administration, analysis, and reporting of surveys. Data entry can be from stand-alone PC's, via a network, by e-mail. Responses can also be scanned directly from the survey form. Computes descriptive statistics, Chi-square, and correlation, and can compare surveys administered at different times.

System requirements: 386SX IBM compatible (486SX recommended); Windows 3.1 or higher or Windows 95; 8 MB RAM; 25 Mhz processing speed or greater.

SurveyWin and SurveyFirst

By Raosoft (http://www.halcyon.com/raosoft/). SurveyWin is a survey management package that includes a questionnaire builder, data entry system, database management tools, and a menu-driven statistical analysis module. SurveyFirst is a stripped-down version of Survey with a 1,000 record limit. Data is stored in dBASE III format. Analysis module includes descriptive statistics, t-tests, chi-square, correlation and regression. Raosoft Survey is being used by the Army Research Institute in the Occupational Data, Analysis, Requirements, and Structure program (ODARS),

Cost: $495.00 for SurveyWin, $195 for SurveyFirst

WWW Survey Assistant

By S Ware (http://or.psychology.dal.ca/~wcs/S_Ware.html). S Ware is a company formed by a Dalhousie University graduate student for the distribution of WWW Survey Assistant, a shareware Internet survey manager. The home page provides a comparison table of WWW Survey Assistant with other Internet survey software packages. WWW Survey Assistant prepares the html for posting a survey on the Internet, and creates a CGI program for managing user-submitted responses to the survey. The program allows immediate feedback to survey respondents. Data verification and manipulation is done online through the CGI program. Survey Assistant can filter out multiple submissions, and has security protection features.

System requirements: A Web server and access to CGI-bin; an HTML Web form document, CGI program, and Perl programming language.

Cost: $19.95 per year unlimited use site license for individuals and not-for-profit research organizations, $99.95 per year for for-profit research and corporations.